NMFS List of Issues Unresolved in BDCP Administrative Draft

(3/19/2012)

This is a preliminary list of "red flag" issues that NMFS intends to refine prior to March 31st. We consider these red flag issues as they have the potential to trigger a finding of insufficiency if not resolved prior to final submittal, and/or resolution of the issue may have a significant effect on conclusions, and therefore the overall design of the project. We have also included recommendations for addressing these issues, where appropriate, and we are available and would like to work towards solutions for issues not easily addressed. We understand that ICF may be already working to resolve a number of these issues, and/or that resolution may be contained in a portion of the documents that we have not yet been able to review.

- **Hood Diversion Bypass Flows**

  The Effects Analysis of the Preliminary Proposal (PP) raises concerns over reduced flows downstream of the North Delta diversions, especially in winter and spring months. These flows relate to:

  A. Increased frequency of reversed Sacramento River flows at the Georgiana Slough junction. The January 2010 PP rules included a provision that higher levels of pumping would not increase these reverse flows. Calsim II results provided by CH2M-Hill indicate that the PP will increase the percent of time Sacramento River flows are reversed, causing increased entrainment of juvenile salmonids into the Central Delta. If the frequency of reverse flows increases due to the PP, then the diversion amounts allotted under Level 2 and/or 3 could not be implemented. The DSM2 analysis of reverse flows in the DPM suggests that tidal marsh restoration in the Delta will nearly offset both the effects of sea-level rise and large water diversions from the Sacramento River, a conclusion which needs much more explanation in the EA (see comment on tidal marsh effects).

  B. The long-term viability of sturgeon populations. There are concerns that Sacramento River flow reductions will impact the reproductive success of white and green sturgeon, which have been documented to produce strong year classes mostly in years with high flows in April and May (AFRP study). We do not know if this has been addressed in revised Appendix C.

  1. Further explanation and analysis of the reverse flow issue.

  2. Work with the Services to find a diversion scheme that is still likely to be permittable after adequate modeling and analysis has been conducted.

  ICF Response: We agree and will work to better explain this issue and work with the fish and wildlife agencies to find a diversion scheme that can move the project forward.

- **Salmonid Net Effects**

  All salmonid species are grouped together, with no separate evaluations for the separate ESUs of Chinook salmon or for steelhead. It is important for the net effects analysis to describe individual ESUs/species, and provide full consideration of the life-history diversity and timing exhibited by each ESU/species. We also need the Sacramento River populations and San Joaquin populations for Spring-run Chinook, Fall-run Chinook, and Central Valley steelhead summarized by river basin, prior to the roll-up by ESU/DPS. Steelhead life-history and ecology especially warrant a separate evaluation. "Net effects" is useful for comparing alternative operations, but will not provide the robust effects analysis needed for ESA purposes (see comment on ESA baseline).

  Separate all Chinook by ESU, by San Joaquin and Sacramento populations, and separate steelhead in all analyses and discussion.

  ICF Response: We agree as was noted in the Chapter 5 Admin Draft. We plan to work closely with the fish and wildlife agencies to develop separate analyses for each salmonid run and, where appropriate, each population.

- **ESA Baseline, Future Conditions, and Climate Change**

The baseline condition and projections of future baseline conditions, including effects of climate change, need to be re-written to be consistent with the 2009 Biological Opinion and current case law. Upstream effects associated with climate change need to be in the baseline and future conditions, with any effects of the project (in the Delta or associated with upstream operations) added to that future condition to determine jeopardy. A project proposed in this type of baseline conditions needs to more than offset its effects in order to alleviate a jeopardy finding.

ICF Response: This is an issue that legal staff from the fish and wildlife agencies should address with DWR legal counsel. It is critical that this issue be resolved quickly because of its implications for the effects analysis.

- Analysis of Water Temperature Impacts

  Lethal and sub-lethal water temperature thresholds need to be examined at a finer scale. Currently the effects analysis relies heavily on a Reclamation water temperature model which can only estimate monthly values, which have limited value for predicting project effects on fish. In addition, the effects analysis has only presented frequencies of temperature threshold exceedances, while the magnitude and duration of exceedance is also very important. We do not know if this has been addressed in revised Appendix C.

  1. Provide tables and probability plots of magnitude and duration of temperature exceedances at certain upstream locations, by water year type and month.
  2. Technical discussion with Reclamation and CH2MHill about how to post-process data.
  3. Investigate the use of SWFSC's Sacramento River temperature model to predict project effects and make hindcasts of empirical temperatures.

  ICF Response: This comment was also made on Appendix C and we would like to further discuss how this analysis would contribute to the overall net effects analysis and how it could be done in a way that is clear and useful.

- Assumption of Habitat Restoration CM Success

  Predicted adverse impacts of the PP are often negated by unsubstantiated statements that habitat restoration will help mitigate the effects. EA always assumes restoration will be successful and work as predicted, with little or no evidence to support their prediction.

  1. It is imperative to avoid language such as "This conservation measure will...", because the anticipated CM outcomes are based on conceptual thinking, not execution. To be able to comprehensively think through the adaptive management and monitoring plan, implementers need to try to anticipate a range of responses that must be managed in order to be prepared for the uncertainty of the response.
  2. Alternative outcome scenarios should be evaluated to bracket the range of possible outcomes from proposed habitat restoration.

  ICF Response: We can be clearer about the assumptions that create the foundational analysis of habitat restoration benefits. With little empirical data, no site-specific plans, and a long-term planning period, even ranges of potential outcomes would not provide more meaningful analysis. However, we can be clearer that a range of outcomes can be expected. We can work with the agencies to describe what that potential range may be. We can also clarify that the success of restoration effects is expected to increase over time as more projects are implemented and we learn from each project.

- Overreliance on Real-time Operations and Adaptive Management

  Predicted adverse impacts of PP are often negated by unsubstantiated statements that real-time operations and adaptive management will help mitigate the effects. For example, long-term trends towards reduced carryover storage may not be able to be mitigated using real-time operations. How adaptive management might work in

this situation has not been fully assessed. There are going to be limitations on what adaptive management and real time operations can accomplish.

Examine recent (five to ten years) real-time management of the cold water pool in Shasta Reservoir to determine both the effectiveness of real-time operations and a range of adaptive management options.

ICF Response: We agree that recent years can be evaluated to determine how well cold-water pool and temperature standards in upstream areas can operate. Additionally, we propose exploring the inclusion of upstream temperature controls in the project to reduce uncertainty of these effects and to offset CALSIM's modeling approach to better reflect the actual operations of the project.

- North Delta Predation Estimates

Mortality from predation is difficult to predict, as there is a high level of uncertainty associated with predation on juvenile salmonids. The estimate of 133 striped bass per screen is not sufficient without giving equal consideration to higher estimates of striped bass per screen (GCID empirical studies showed a 5% per screen loss rate, much higher than the <1% from the bioenergetics model used in the DPM).

1. Bracket the analysis of predation around a 5% per screen loss assumption.

2. Investigate the use of DWR's hydrodynamic model to assess local flow alterations at the proposed diversion structures, including the creation of predator holding areas. Specific questions are whether the model can simulate on-bank structures and the additional hydrodynamic effects of active pumping.

ICF Response: We would like to review and discuss with you the empirical data from GCID to develop the appropriate range of predation that should be evaluated for the north Delta intakes.

- Predator Control Conservation Measure

We agree that predation is a significant risk factor to the listed species, but the assumed positive results of this CM are questionable and unsupported (see F.5.4.1.4 in Appendix F). As an example, localized control of striped bass may not be feasible as this species exists throughout the Plan area and are highly mobile. Few specific details have been presented on how the CM will be implemented, and an aggressive predator removal program could result in significant incidental take of listed species. Due to the high level of uncertainty, we find it very unlikely that we could rely on this measure for any benefits during the permit process.

Remove this CM measure from the plan, and move it to an experimental research program and link to adaptive management. Reflect this appropriately in the EA.

ICF Response: We propose discussing with the agencies which areas are most important targets for predator removal and further develop a description to reduce uncertainties about its effectiveness in those key areas.

- Delta Passage Model

DPM is used as the sole predictor of smolt survival in baseline and PP scenarios. However, the assumptions, inputs, and results are still being validated and reviewed. The datasets used in this model are very limited and largely based on results from hatchery late-fall run Chinook, which are then being applied to other runs of Chinook.

Continue refinement and development of DPM. Weigh validity of results against those of other models and relationships. The use of Newman, 2003 may be another tool to use for assessing the survival of fall and spring run smolts through the Delta.

ICF Response: We agree and appreciate the collaborative nature in which we've been working to move this analysis forward. We will investigate the use of Newman 2003.

- Deficient Analysis of Fry Passage/Survival

Because the DPM model is only for smolt sized fish, the salmonid analysis is insufficient as it provides no information on fry-sized salmonid passage/survival.

Add qualitative analysis of fry survival based on best available data. Perhaps add time/added mortality to a modified version of an updated DPM model.

ICF Response: We agree and are working on such analysis.

- **PTM Runs Inadequately Capture Altered North Delta Hydrodynamics**

  PTM model runs did not include conditions in which ND diversions would be at the upper limits of allowable pumping (high proportion of total river flow). The technical memo from NMFS and USFWS highlighted the issue and the resolution to the problem. We will need additional modeling runs to adequately assess ND diversion impacts on salmonid travel time and route entrainment.

  Do additional PTM analysis following guidelines outlined in NMFS/USFWS memo.

  ICF Response: We plan to work with the agencies to develop more informative PTM runs for this issue as well as others in the north Delta subregion (i.e., agricultural diversions).

- **D1641 Export/Inflow Ratio**

  Exports under the PP exceed the current D-1641 Delta Export/Inflow standard. (The PP calculation method measures Sac River inflow below the North Delta diversions and does not include ND diversions as part of total exports).

  1) *Provide summary analysis of differences between PP and EBC by month and water year type using alternate E/I calculations.*
  2) *Show resulting flow data for both calculation methods.*

  ICF Response: We will work with the agencies to develop this analysis.

- **Limited Sample Size for DSM2**

  Number of years (16) is insufficient and provides a poor representation of some water year types. With current computing speeds and abilities, it is reasonable to run all 82 years if needed.

  Work with fish agencies to determine which additional years/water year types would be sufficient.

  ICF Response: We will need to work with modeling staff (CH2M Hill) to determine how this could be done, or if alternative modeling, such as CALSIM, could be more easily used for some key locations.

- **Yolo Bypass**

  Yolo Bypass has great potential for fisheries benefits, but the current EA may be overstating the benefits without adequate studies or data to support these conclusions. Without project specific plans to help quantify the effects, concerns remain about issues such as sturgeon passage, juvenile salmonid survival under lower flow regimes, ability to get juveniles into the floodplain through notch and reduction of flows in the mainstem Sacramento River to accommodate additional flooding in Yolo Bypass. Also, some races/runs of salmon may not have access to Yolo Bypass.

  Provide project specific plans and consider the risks of managing the floodplain under lower flows related to issues above.

  ICF Response: Project-specific plans for the bypass have not yet been developed, but through adaptive management, coordination with agencies during permitting and design, and maintenance, the risks associated with CM2 can be reduced. Additionally, we propose exploring a sturgeon rescue program as part of this CM to ensure reduced risks.

- **Entrainment in South Delta**

  No inclusion of certain analysis (OMR-salvage regressions by species by month/water year type) which would provide additional insight into entrainment relationships.

Include this analysis for salmonids and sturgeon.

ICF Response: We are not aware of these regressions, but would like to discuss with the agencies what they are and their applicability to the EA.

- **Conflicting Model Results**
  Different models used to analyze the same species and locations do not always produce results that agree with each other (notably results of several models, such as SacEFT, SWRQM, and SALMOD, applied to upstream habitat conditions).
  Provide explanation for differences in results, indicating different model drivers that may be influencing the results of one model more than the results of a different model. Additional actions to be provided after full release of analyses included in Chapter 5 Appendices

  ICF Response: We can be clearer about the differing inputs and how that translates into different outputs, as well as how those drive the net effects analyses.

- Channel Margin Habitat
  Altered flows resulting from the North Delta diversions may result in reduced water levels affecting the percentage of time that current wetland and riparian benches are inundated.
  Compare anticipated water levels under future scenarios with those in the design documents of restored wetlands and riparian benches to analyze potential dewatering of those features.

  ICF Response: We agree and this analysis is included in the revised Appendix C.

- Construction and Maintenance Impacts
  Adverse impacts on sturgeon, fall-run Chinook adults, and steelhead adults can be anticipated during construction of North Delta facilities, yet there is no mitigation planned for impact pile-driving or dredging.
  Discuss ways of minimizing impacts and implementing mitigation for species not protected by work window.

  ICF Response: We can discuss additional methods for minimization besides restoration.

- Tidal Marsh Impacts on Riverine Flow
  The effect analysis assumes that restored tidal marsh will act to decrease flow reversals, which has not been well explained. It seems that tidal marsh restoration was modeled as a single configuration; there has been no description of that configuration to indicate how they were implemented in the hydrodynamic models. Therefore, there is a lot of uncertainty regarding model results.
  Document changes to hydrodynamic models that were implemented to characterize tidal marsh restoration.

  ICF Response: While some information will not be made available to the public, and therefore won't appear in the EA, we have substantially expanded the discussion of assumptions and modeling efforts used for the analyses. Some of this information is in the revised App C. We would like to discuss with the fish and wildlife agencies the potential to provide confidentially additional documentation of the hypothetical restoration scenario that was used to conduct the effects analysis.

- Cumulative Effects = Salmon Extinction
  The analysis indicates that the cumulative effects of climate change along with the impacts of the PP will result in likely extinction of winter-run and certain populations of spring-run over the term of the permit.
  Consider actions in the PP that will protect and conserve suitable habitat conditions in the upper river for the species under the 50 year HCP.

ICF Response: As NMFS and others have pointed out, the projected adverse temperature regimes under both existing conditions and the PP in early and late-long term, are unlikely to occur under current real-time operation practices. As a result, the potential cumulative effect of both climate change and the project may be misinterpreted. As described above, we would like to discuss the inclusion of temperature controls, which would likely eliminate or substantially reduce the actual likelihood of BDCP contribution to extinction, and may help to offset some of the climate change effects under some circumstances.

- Holistic Estuarine Evaluation

  The effect analysis should examine synergistic and cumulative ecological impacts associated with reducing inflows to an estuary that is already severely degraded, and discuss the importance that water quantity, quality, and the natural hydrograph have to the ecosystem, as well as the direct impacts on native fish species. So far, the impacts to fish have mostly been examined in a piecemeal fashion (e.g., examining impacts of flow reduction on adult homing).

  Incorporate a holistic evaluation of impacts on the estuarine ecosystem. Include discussion of the importance of water quantity, quality, and the natural hydrograph to the ecosystem, and the direct impact that changes to these conditions have on native fish species.

  ICF Response: We would like to discuss this comment and request additional detail about what is meant. The net effects analysis is an attempt to weave together all of the various effects on the species, including the interaction of various effects. For example, we examined how changes in the location of the low salinity zone could affect distribution of delta smelt and how that would change their exposure to microcystis. Likewise, the hydrodynamic modeling integrates the changed tidal exchange based on a restoration configuration. Because the net effects analysis is qualitative in nature, our ability to evaluate synergistic or interactive effects is mostly limited to pairwise comparisons or linear sequences of effects, as opposed to multivariate effects. However, we agree that more information can be developed to demonstrate the similarities and differences between the project and historical conditions. If the fish and wildlife agencies could provide examples of the synergies that are missing from the effects analysis, we could focus on those effects.

- **Modeling of Sea-Level Rise**

  The effects analysis assumes 15 cm and 45 cm of sea-level rise in the early long-term and late long-term, respectively. This is less than predicted in many recent publications, some of which predict a sea-level rise in the range of 1 to 1.5 meters.

  Suggest using a larger value for sea level rise in the late long-term.

  ICF Response: The assumption of sea level rise of 45 cm (17 in) by 2060 is consistent with predictions made by the USGS and guiding adopted policy by other agencies (e.g., BCDC). Sea level rise of 1 to 1.5 meters is not predicted to occur until the end of the century (2100), well beyond the permit term of BDCP. Additionally, the project includes requirements to meet salinity standards. Because increased sea level would increase salinity, meeting these salinity standards would require even more outflows (and less exports). This pattern is captured in the current analysis of changes in outflow from EBC →ELT→ LLT: outflow increases to meet these Delta demands. Changing the assumption of sea level rise is a policy-level decision.

- Cumulative Impacts Assessment

  Deference should be given to known population drivers and documented relationships (e.g., sturgeon recruitment relationship with flows is well documented, though the exact mechanism is not completely understood). Since flow is a key component of habitat for aquatic species do not assume that it can be substituted for by other actions.

Do not assume that incremental benefits in a conservation measure will compensate for known population drivers related to flow.

ICF Response: The analysis considers all of the potential effects together to determine the total effect on the species. We can work with the agencies to determine how to weight different analyses or include an improved description or justification for certainty ratings.

- Incomplete Analyses and Documentation

  The full appendices were not released concurrently with Chapter 5 which makes review of the results problematic.

  Provide all appendices/analysis simultaneously so Services can have all pertinent information used in Effects Analysis summaries without having to backtrack weeks later.

  ICF Response: We have been coordinating with the agencies to develop these revisions and expect that these revisions address agency concerns. The majority of Appendix C was released on 3/26/12 and the revised Appendix B will be released on 3/30/12.

- Insufficient Biological Goals and Objectives

  The conservation measures are sometimes defining the BDCP species objectives, which is insufficient. 30% juvenile through-Delta survival is not a suitable goal for a 50 year plan.

  The BDCP objectives should be biological, species-level outcomes.

  ICF Response: We are coordinating with the agencies to refine the BGOs.

- Overstating Benefits of OMR Flow Improvements

  The improved OMR flows occur during wetter years when OMR is less important. Preliminary Proposal OMR flows are often worse than, or similar to, EBC in drier years. Sacramento Basin fish are most vulnerable to entrainment into the central Delta when Sacramento River flows have the potential to reverse and OMR levels are below -2,500 cfs. San Joaquin basin fish are best protected by increased Vernalis flows and/or a HORB which the PP does not improve or address.

  1. Analyze the risk in different water year types and with different flow levels in the Sacramento River.
  2. Implement Scenario-6 to help address the adverse impacts seen under the PP.

  ICF Response: We are working on a proposal to address water operations issues, including those occurring in dry years in the south Delta. We plan to coordinate with the agencies soon.

- Non-Physical Barriers

  Assessment of non-physical barriers is inadequate, and the potential negative effects of predation associated with non-physical barriers haven't been assessed.

  Include analysis of potential adverse effects of non-physical barriers.

  ICF Response: Appendix F includes this analysis, but we agree that additional information could be gleaned from the HORB and Georgiana Slough studies.

- **Modeling Documentation**

  Further documentation of why the models are giving the results they are is often needed, as well as sensitivity analyses to understand how robust are the results to the assumptions that are being made.

ICF Response: As described above, we can be clearer about the basis for results of modeling outputs.

- Carry-over of OCAP RPA's on technological improvements to the South Delta Facilities

  By not carrying forward technological fixes in the South Delta called for in the OCAP RPAs into the Conservation Measures, we would expect the effects analysis to specifically flag this and analyze it as a degradation to future conditions (future baseline).

  Add south Delta technological improvement RPA's to Conservation Measures

  ICF Response: We will work with the agencies to determine how to integrate this into the project.

- **QC of Documents and Modeling Runs**

  Due to tight schedules, we believe products have come to us without adequate quality control. We have numerous comments/concerns on QC issues on figures, graphs and text in EA, DPM input/outputs, and the Hood Bypass rule.

  Devise a quality control protocol. Develop timelines that allow for complete documents to eliminate interim and incomplete document review.

  ICF Response: We agree, but the revised versions of the appendices correct most, if not all, of these errors.

- Feasibility of 65K acres of Habitat Restoration

  Further evaluation of land available for habitat restoration indicates potential roadblocks to acquiring all the land proposed. DWR's own analysis suggests that 65K acres is very unlikely.

  Address alternative actions or measures to compensate for this possibility.

  ICF Response: We believe that 65,000 acres of tidal restoration is feasible based on recent assessments. We would like to discuss these results with the fish and wildlife agencies and ways to improve the documentation to demonstrate feasibility.